

REMARKS

In response to the Office Action dated September, 3 2008, claims 1, 3-5, 7-11, 34, 37, 44 and 48-64 are currently pending in the subject application, and are presently under consideration. Claims 1, 3-5, 7-11, 34, 37, 44 and 48-64 are rejected. Claims 1, 44, 49-52, and 54 have been amended. Claims 8, 48, and 53 have been cancelled. Favorable reconsideration of the application is requested in view of the amendments and comments herein.

I. Rejection of Claim 56 Under 35 U.S.C. §102(b)

Claim 56 stands rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Publication No. 2002/0122008 A1 to Caimi, et al. ("Caimi"). Claim 56 recites a digital processing component that produces a control signal from the digital representation for each analog signal, representing an associated antenna, specifying the at least one frequency band containing the interfering signal. The Examiner asserts that this is taught in a two short passages in Caimi stating that a filter may have a notch at "the frequency of a nearby emitter, or at the frequency of an intermodulation product formed in the transmission line," ¶(0035) and that the digital filters and phase shifters can be controlled by a processor to "select or reject a particular signal" during beamforming (¶0039). It will be appreciated that this does not provide an explicit teaching of producing a control signal specifying a frequency band containing an interfering signal.

The Examiner is respectfully reminded that to reject a claim under 35 U.S.C. §102, it is necessary to provide a single prior art reference that discloses each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co., 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). The disclosure can be explicit or inherent, but a limitation is inherently disclosed by a reference only if it is necessarily present and a person of ordinary skill in the art would recognize its presence. Crown Operations Int'l Ltd.v. Solutia Inc., 289 F.3d 1367, 1377, 62 USPQ.2d 1917, 1922-1923 (Fed. Cir. 2002). It is respectfully submitted that the presence of a notch in the digital filter at the frequency of a

nearby emitter or at the intermodulation frequency and a teaching that the filter can be controlled by a processor does not necessarily require producing a control signal from a digital representation of an analog signal specifying a frequency band containing interference. In the multi-carrier transceiver system that the Examiner reads Caimi to comprise, with a multi-carrier signal distributed by individual filters into individual carriers, *See* the Office Action, pg. 4, each signal would have to be at a different frequency for the separation to occur. Accordingly, a frequency for “a nearby emitter” in a group of antennas broadcasting a different frequency would not require that a frequency band be obtained from a digital representation of a received signal; it would be known a priori from the configuration of the transceiver. Similarly, the potential intermodulation products among the various frequencies would be easy to predict without relying on the received signal. The discussion of selecting or rejecting signals at the filter and phase shifter in paragraph ¶0039 is presented in the context of an antenna array performing beamforming; it has nothing to do with identifying a frequency band associated with an interfering signal. As stated below, Applicant’s representative disagrees with the interpretation of Caimi presented by the Examiner, but addresses the art as interpreted by the Examiner in this rejection for the purpose of responding fully to the Office Action. The Examiner has failed to show an explicit teaching of producing a control signal *from the digital representation for each analog signal*, representing an associated antenna, specifying the at least one frequency band containing the interfering signal as recited in claim 56, and this teaching is not necessarily present, as other, more plausible interpretations of the cited passages exist. It is thus respectfully submitted that claim 56 is patentable over Caimi, and withdrawal of this rejection is respectfully requested.

II. Rejection of Claims 1, 4, 5, 7, 34 and 37 Under 35 U.S.C. §103(a)

Claims 1, 4, 5, 7, 34 and 37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of U.S. Patent No. 7,184,490 B1 to Rybicki, et al. ("Rybicki"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Claim 1 recites a signal distributor that deserializes the analog multi-carrier signal into a plurality of analog carrier signals, the signal distributor comprising at least one stopband filter having at least one stopband, each of the at least one stopband having an associated center frequency, the digital exciter being operative to adjust the respective center frequencies of the at least one stopband. The Examiner relies on Caimi to provide this teaching, stating that the summer, digital filters, and phase shifters in FIG. 13 of Caimi “deserialize” the signal, with “deserialize” read broadly to encompass a serial signal being split into a plurality of parallel signal. Claim 1 has been amended to clarify that the claimed signal distributor was intended to perform an actual deserialization, that is, a signal comprising a plurality of time interleaved signals is separated into its constituent signals. The filters and summer described in Caimi would not separate a signal in this manner, and even reading Caimi in view of Rybicki, nothing in the cited art appears to remedy this deficiency. It is thus respectfully submitted that claim 1 is patentable over Caimi and Rybicki.

In the rejection of claim 8, the Examiner cites U.S. Publication No. 2003/0171674 A1 to Jago, et al. ("Jago") as teaching a time division multiplexer because to simplify the system and reduce the hardware required. It is respectfully submitted, however, that the use of a time division multiplexer and demultiplexer, with the accompanying clocking elements and oversampling would add significantly to the complexity and necessary hardware of Caimi as compared to the filter-based separation of superimposed carrier signals that the Examiner has read into Caimi. To the extent that the Examiner disagrees with this assertion, an explanation of the hardware that could be removed from Caimi in view of the incorporation of a time division multiplexer/demultiplier arrangement is respectfully requested. Since the Examiner has provided no reason why one of skill in the art would seek to incorporate the teachings of the ultrasound imaging device of Jago into the Examiner’s proposed combination of Caimi and Rybicki, it is respectfully submitted that the Examiner has not provided a *prima facie* case of obviousness.

Claim 34 recites distributing an analog multi-carrier signal into a plurality of analog signals, where distributing the analog multi-carrier signal comprises filtering a plurality of copies of the multi-carrier analog signal at respective tunable filters, at least one of the tunable filters

being a multiband tunable filter. The Examiner appears to argue that all tunable filters are inherently multiband, stating that “as the digital filter [sic] are controlled by a control signal from the transmitter to select a particular signal, therefore, they can be adjusted to function as a multiband adjustable filter.” It is respectfully submitted that one of skill in the art, reading the claim in light of the specification, would understand that the term “multiband tunable filter” refers to a filter having multiple tunable bands. Accordingly, the tunable filters of Caimi do not provide the recited element, and nothing in Rybicki appears to remedy this deficiency. It is thus respectfully submitted that one of skill in the art would not find filtering a plurality of copies of the multi-carrier analog signal at respective tunable filters, with at least one of the tunable filters being a multiband tunable filter, to be obvious in light of Caimi in view of Rybicki.

With regard to both claims 1 and 34, however, there is a more fundamental defect in Caimi, specifically that Caimi contains no teaching or suggestion of generating a digital multi-carrier signal at an exciter and distributing an analog multi-carrier signal into a plurality of analog signals, as the term “multi-carrier signal” would be used and understood by one of skill in the art. The cited portion of Caimi, particularly FIG. 13 and the accompanying text, teaches a transceiver for servicing the elements of a smart antenna array in a beamforming arrangement. Beamforming, as the term is used in the art, generally refers to a manipulation of the amplitude and phase of a common signal broadcast at a multiple antenna structure used to broadcast a directional signal by taking advantage of interference between phase shifted copies of a signal. As Applicant’s representative understands the process and the system of Caimi, each antenna array receives a copy of the broadcast signal, with variations in phase and amplitude provided by the phase shifters 172 and the digital filters 170 on that path. The digital signal would therefore be identical until it reached the phase shifter on each path; there is no distribution of a multi-carrier signal into its constituent carrier signals as recited in claims 1 and 34. Rybicki again fails to remedy this deficiency.

The Examiner also admits that Caimi in view of Rybicki fails to teach converting a multicarrier signal and then distributing the analog multicarrier signal into its constituent signals, but cites *In re Einstein*, 8 USPQ 16 (CCPA, 1931), for the proposition that mere reversal of the

working components in a device involves only routine skill in the art. In *Einstein*, a prior art reference taught a CAM follower and a CAM groove identical to that of the subject application, except that the follower was attached to the moving spindle, whereas in the subject application, the sleeve containing the groove was attached to the spindle. In the claimed systems, there is no mere reversal to two identical elements. The Examiner appears to be arguing that there is no difference between demultiplexing or deserializing a multicarrier analog signal and deserializing a multicarrier digital signal, and that the same functional components, merely reversed, as in *Einstein*, would function identically. Applicant's representative respectfully submits that this is inconsistent with his understanding of digital and analog signal processing. The subject application notes that significant cost savings can be realized through use of the claimed system, reducing the cost and complexity of transmitting base stations significantly by eliminating the extra signal conversion components necessary in a system like Caimi. See ¶0025. If the mere reversal of these components were apparent to one of ordinary skill in the art, it is respectfully queried as to why Caimi and the other references cited by the Examiner did not appreciate this advantage and similarly realize these savings through a simple "reversal of the essential working parts". Applicant respectfully points out that the precise phase shifting and filtering necessary for a beamforming arrangement would be more efficient in the digital domain, and therefore one of skill in the art would not seek to modify Caimi in view of Rybicki in the manner proposed by the Examiner. Absent a teaching or suggestion in the cited art of the claimed arrangement, it is respectfully submitted that claims 1 and 34 define over the cited art.

For the reasons described above, claims 1, 4, 5, 7, 34 and 37 should be patentable over the cited art. Accordingly, withdrawal of this rejection is respectfully requested.

III. Rejection of Claim 3 Under 35 U.S.C. §103(a)

Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Rybicki as applied to claim 1, and further in view of U.S. Patent No. 6,291,924 B1 to Lau, et al. ("Lau"). Claim 3 depends from claim 1, and Lau does not appear to remedy the

deficiencies of Caimi and Rybicki as described above. It is thus respectfully submitted that claim 3 is allowable over the cited art, and withdrawal of this rejection is respectfully requested.

IV. Rejection of Claim 8 Under 35 U.S.C. §103(a)

Claim 8 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Rybicki as applied to claim 1, and further in view of U.S. Publication No. 2003/0171674 A1 to Jago, et al. ("Jago"). Claim 8 has been cancelled.

V. Rejection of Claim 9 Under 35 U.S.C. §103(a)

Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Rybicki as applied to claim 1, and further in view of U.S. Patent No. 6,664,921 B2 to Pratt ("Pratt"). Claim 9 depends from claim 1, and Pratt does not appear to remedy the deficiencies of Caimi and Rybicki as described above. It is thus respectfully submitted that claim 9 is allowable over the cited art, and withdrawal of this rejection is respectfully requested.

VI. Rejection of Claims 10 and 11 Under 35 U.S.C. §103(a)

Claims 10 and 11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Rybicki as applied to claim 1, and further in view of U.S. Patent No. 5,805,983 to Naidu, et al. ("Naidu"). Claims 10 and 11 depend from claim 1, and Naidu does not appear to remedy the deficiencies of Caimi and Rybicki as described above. It is thus respectfully submitted that claims 10 and 11 are allowable over the cited art, and withdrawal of this rejection is respectfully requested.

VII. Rejection of Claim 44, 48, 49, and 52 Under 35 U.S.C. §103(a)

Claim 44 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of U.S. Publication No. 2003/0016771 A1 to Nuutinen, et al. ("Nuutinen"). Claim 44 has been amended to include the subject matter of claims 48 and 53, and the patentability of claim 44 over Caimi and Nuutinen, as well as U.S. Patent No. 6,664,921 B2 to Pratt ("Pratt") and U.S.

Publication No. 2005/0218984 A1 to Yin ("Yin") will be addressed herein. It is respectfully submitted that the cited art fails to teach or suggest all of the limitations of claim 44.

Claim 44 recites a signal combiner that combines at least two of the analog signals from the plurality of antennas into a multi-carrier signal and an analog-to-digital converter that converts the analog multi-carrier signal into a digital multi-carrier signal, the signal combiner comprising a bypass, such that an analog signal from at least one of the pluralities of antennas can bypass the signal combiner. The Examiner admits that Caimi in view of Nuutinen and Pratt fail to provide a teaching of providing a bypass to a signal combiner in a receiver system. Instead, the Examiner relies on Yin to provide this teaching citing lines 16-18 of paragraph 0050, which state that "[c]ombined functions of the internal framer (INT FRMR) 216 and the mapper 214 and DEMUX 218 may be bypassed via connection 236." The Examiner reads this to state that the framer 216 provides a combining function, while the sentence as written does not support this assertion. The "combined functions" of the three elements is simply the function of the three elements in aggregate, none of which, at least so far as Applicant's representative thorough reading of Yin has been able to determine, perform any function that would be considered a "combining function." It is thus respectfully submitted that Yin does not contain the teaching attributed to it by the Examiner, and that nothing in Yin, even read in combination with Caimi, Nuutinen, and Pratt, would lead one of skill in the art to the claimed system.

Claim 48 has been cancelled. Claims 49 and 52 have been amended to depend from claim 44, and are allowable for at least the same reasons. Accordingly, withdrawal of this rejection of claims 44, 48, 49, and 52 is respectfully requested.

VIII. Rejection of Claim 50 Under 35 U.S.C. §103(a)

Claim 50 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Nuutinen and Pratt as applied to claim 48, and further in view of U.S. Publication No. 2006/0072520 A1 to Chitrapu, et al. ("Chitrapu"). Claim 50 depends from claim 44, and Chitrapu does not appear to remedy the deficiencies of Caimi, Nuutinen, Pratt, and Yin as

described above. It is thus respectfully submitted that claim 50 is allowable over the cited art, and withdrawal of this rejection is respectfully requested.

IX. Rejection of Claim 51 Under 35 U.S.C. §103(a)

Claim 51 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Nuutinen and Pratt as applied to claim 48, and further in view of U.S. Patent 6,473,416 B1 to Lee ("Lee"). Claim 51 depends from claim 44, and Lee does not appear to remedy the deficiencies of Caimi, Nuutinen, Pratt, and Yin as described above. It is thus respectfully submitted that claim 51 is allowable over the cited art, and withdrawal of this rejection is respectfully requested.

X. Rejection of Claim 53 Under 35 U.S.C. §103(a)

Claim 53 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Nuutinen and Pratt, and further in view of Yin. Claim 53 has been cancelled.

XI. Rejection of Claims 54 and 55 Under 35 U.S.C. §103(a)

Claims 54 and 55 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Nuutinen and Pratt as applied to claim 48, and further in view of U.S. Patent No. 6,128,470 to Naidu, et al. ("Naidu"). Claims 54 and 55 depend from claim 44, and Naidu does not appear to remedy the deficiencies of Caimi, Nuutinen, Pratt, and Yin as described above. It is thus respectfully submitted that claims 54 and 55 are allowable over the cited art, and withdrawal of this rejection is respectfully requested.

XII. Rejection of Claims 57, 58 and 61 Under 35 U.S.C. §103(a)

Claims 57, 58 and 61 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Pratt. Pratt does not remedy the deficiencies of Caimi, as pointed out above. Further, as discussed previously, with regard to claims 1 and 34, the smart antenna array of Caimi fails to teach or suggest combining a plurality of received signals into a *multi-carrier*

signal, as the term is used in the specification and understood in the art, as all of the received signals in a smart antenna array would have identical carrier frequencies. Pratt does not appear to remedy this deficiency, and it is thus respectfully submitted that Caimi in view of Pratt fails to teach or suggest the signal combiner recited in claim 57. Claims 58 and 61 each depend from claim 57 and are allowable for at least the same reasons. Accordingly, claims 57, 58 and 61 should be patentable over the cited art and withdrawal of this rejection is respectfully requested.

XIII. Rejection of Claim 59 Under 35 U.S.C. §103(a)

Claim 59 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Pratt as applied to claim 57, and further in view of Chitrapu. Claim 59 depends from claim 57, and Chitrapu does not appear to remedy the deficiencies of Caimi and Pratt as described above. It is thus respectfully submitted that claim 59 is allowable over the cited art, and withdrawal of this rejection is respectfully requested.

XIV. Rejection of Claim 60 Under 35 U.S.C. §103(a)

Claim 60 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Pratt as applied to claim 57, and further in view of U.S. Patent No. 6,473,416 B1 to Lee ("Lee"). Claim 60 depends from claim 57, and Lee does not appear to remedy the deficiencies of Caimi and Pratt as described above. It is thus respectfully submitted that claim 60 is allowable over the cited art, and withdrawal of this rejection is respectfully requested.

XV. Rejection of Claim 62 Under 35 U.S.C. §103(a)

Claim 62 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Pratt as applied to claim 57, and further in view of Yin. Like claim 44, claim 62 recites a bypass around a signal combiner that produces a multi-carrier signal from a plurality of carrier signals. The deficiencies of the proposed combination of Caimi, Pratt, and Yin with respect to this element are discussed above with respect to claim 44, and are not repeated here for the sake

of brevity. For the reasons given above, claim 62 should be patentable over the cited art, and withdrawal of this rejection is respectfully requested.

XVII. Rejection of Claims 63 and 64 Under 35 U.S.C. §103(a)

Claims 63 and 64 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Caimi in view of Pratt as applied to claim 57, and further in view of Naidu. It is respectfully submitted that one of skill in the art would not attempt to modify a smart antenna array, which relies on the spatial proximity of precisely phase shifted copies of a signal to produce a directional antenna beam, with the distributed network of Naidu to produce antennas that are spatially remote from the digital processing components. Such a modification would greatly increase the difficulty of maintaining the phase among the signal copies and, in the case of the spatially remote antennas of claim 64, would likely render the Caimi system non-operative. The Examiner claims that applying these teachings to Caimi would be desirable to reduce the cumulative noise in a distributed network, but Caimi is not a distributed network, and the smart antenna array of Caimi would not function as a distributed network, leaving one of skill in the art no reason to modify the system in this manner. Nothing in Pratt remedies this essential incompatibility between Caimi and Naidu. Accordingly, claims 63 and 64 should be patentable over the cited art, and withdrawal of this rejection is respectfully requested.

CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the present application is in condition for allowance. Applicant respectfully requests reconsideration of this application and that the application be passed to issue.

Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,

Date 3 December 2008

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